

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 8]

[1922

XXXV.—CONTRIBUTIONS TO THE FLORA OF SIAM.

ADDITAMENTUM XIII.

W. G. CRAIB.

Michelia Rajaniana, Craib [Magnoliaceae-Magnoliceae]; a *M. lanuginosa*, Wall., cui maxime affinis, petiolo longiore, foliis latioribus supra haud glabris, carpellis maturis approximatis differt.

Arbor circa 20 m. alta (ex *Kerr*); ramuli iuventute crassiusculi, dense fulvo- vel subferrugineo-pubescentes, plus minusve glabrescentes, cortice fusco obtecti, conspicue lenticellati. *Folia* late lanceolata, oblongo-elliptica vel elliptico-ovata, apice obtusa, basi rotundata, 22–29 cm. longa, 10–13.2 cm. lata, coriacea, supra ad costam densius pubescentia, aliter puberula, subtus molliter albo-pubescentia, costa subtus valde prominente, nervis lateralibus utrinque circa 20 supra conspicuis subtus prominentibus intra marginem conspicue anastomosantibus, nervulis arcte reticulatis pagina utraque prominulis, petiolo 2.5–3.5 cm. longo supra canaliculato indumento ei ramulorum simili obtecto suffulta. *Flores* albi (ex *Kerr*), solitarii, axillares, pedicello 5–12 mm. longo indumento ei ramulorum nisi sparsiore et pallidiore simili tecto suffulti; bracteae sericeae; alabastra circa 2.5 cm. longa. *Petala* 12, oblanceolata, obtusa, 3.5 cm. longa, 1 cm. lata. *Filamenta* circa 2 mm. longa, antheris (apiculo 1 mm. longo incluso) circa 4 mm. longis. *Gynophorum* et carpella adpresse ferrugineo-pubescentia, stylo glabro siccato ovario breviora. *Carpella* matura approximata, ambitu oblonga, obtusa, 1.5 cm. longa, fusca, pallide lenticellata, sparse adpresse pubescentia, breviter stipitata.

Doi Intanon, c. 1300 m., evergreen forest, *Kerr* 5342.

Vern. Cham Pi Luang (ex *Kerr*). (see p. 225.)

Talauma Kerrii, Craib [Magnoliaceae-Magnoliceae]; a *T. Hodgsonii*, Hook. f. et Th., ramulis haud glabris, areola stipulari petiolo aequilonga, filamentis brevioribus, connectivo haud longe producto recedit.

Arbor circa 8 m. alta (ex *Kerr*); ramuli primo adpresse hirsuti, mox glabri, cortice luteo-stramineo vel subbrunneo-stramineo obtecti. *Folia* oblongo-oblongolata vel oblonga, apice obtusa, costa excurrente breviter apiculata, basi late cuneata vel rotundato-cuneata, ad 37 cm. longa et 13 cm. lata, coriacea, glabra, subtus pallidiora, costa straminea supra parum elevata subtus valde prominente, nervis lateralibus utrinque 15 rectis bene intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervulis rete pagina utraque prominens efficientibus, margine integra, parum recurva, petiolo ad 5 cm. longo robusto basi conspicue incrassato suffulta, areola stipulari petiolo aequilonga. *Flores* solitarii, terminales, pedicello robusto glauco glabro 4-6-annulato suffulti, ad 5.5 cm. longi. *Stamina* circa 1.4 cm. longa, filamentis brevibus, connectivo breviter producto apice obtuse triangulari vel subtruncato. *Carpella* glabra, tuberculata, stamina bene superantia.

Nan, Doi Tiu, circa 700 m., evergreen forest, *Kerr* 5060.

Artabotrys Vanprukii, Craib [Anonaceae-Unoneae]; *A. siamensi*, Miq., similis, sed ramulorum et foliorum costae pilis adpressis haud divergentibus distinguendus.

Ramuli primo dense adpresse ferrugineo-pubescentes, demum glabri, cortice brunneo vel cinereo obtecti, lenticellis inconspicuis. *Folia* oblongo-elliptica vel obovato-elliptica, apice rotundata obtusave, basi rotundata, cuneato-rotundata, vel rarius cuneata, interdum parum inaequilateralia, ad 12 cm. longa et 5.5 cm. lata, chartaceo-coriacea vel coriacea, supra iuventute ad costam adpresse ferrugineo-pubescentia, matura nitida, glabra vel ad costam inferne puberula, subtus primo dense adpresse ferrugineo-pubescentia, mox ad costam subdense aliter sparse adpresse pubescentia, pallidiora, costa subtus prominente, nervis lateralibus utrinque 9-12 supra conspicuis subtus prominulis intra marginem praesertim superioribus anastomosantibus, nervulis rete pagina utraque conspicuum efficientibus, petiolo 5-10 mm. longo indumento ramulorum suffulta. *Pedunculus* communis mox uncinatus, lignosus, flores saepissime 2 gerens. *Calyx* 6 mm. longus, lobis 7 mm. latis utrinque densius puberulis. *Petala* 2.7 cm. longa, limbo ad 1.5 cm. lato, utrinque breviter adpresse pubescentia. *Antherarum* connectivum supra loculos deltoideum. *Carpella* glabra, stigmatum carpellis subaequilongo.

Pang Pue, c. 400 m., mixed jungle, *Kerr* 4833. Prê, 180 m. *Vanpruk* 501.

Vern. Săban Nga Kûa (ex *Kerr*).

Polyalthia viridis, Craib in *Kew Bull.*, 1914, p. 4, descr. ampl. *Folia* ad 33 cm. longa et 14.5 cm. lata. *Pedicelli* fructiferi lignosi, fere 3 cm. longi, receptaculo convexo 2 cm. diametro.

Carpella glabra, ambitu oblongo-elliptica, 2.5-2.8 cm. longa, 1.8 cm. diametro, stipite 2 cm. longo suffulta. *Semina* solitaria.

Hue Pāng Hūng, Mê Hawng Sawm, c. 500 m., *Kerr* 5474.

Goniothalamus calvicarpa, *Craib* [Anonaceae-Mitrephoreae]; a *G. Griffithii*, Hook. f. et Th., *carpellis* glabris recedit.

Arbor 3-4 m. alta (ex *Kerr*); ramuli primo adpresse ferrugineo-pubescentes, demum glabri, cortice fusco-brunneo vel cinereo-brunneo striato obtecti, lenticellis demum conspicuis. *Folia* elongato-oblancoolato-oblonga, apice acuminata, basi cuneata, 19-29 cm. longa, 4-6 cm. lata, subcoriacea, matura glabra vel subtus pilis adpressis sparsis hic et illic instructa, pagina inferiore pallidiora, costa supra impressa subtus prominente, nervis lateralibus utrinque circa 15-17 rectis vel subrectis bene intra marginem anastomosantibus supra subprominulis subtus prominulis, nervulis paucis subtus conspicuis reticulationem laxam efficientibus, margine integra recurva, petiolo valido circa 5 mm. longo supra canaliculato glabro vel subglabro suffulta. *Flores* virides (ex *Kerr*), axillares, solitarii, pedicello 8-10 mm. longo basi parvi-bracteolato pilis adpressis ferrugineis praesertim superne sparse instructo suffulti. *Calyx* 10 mm. longus, lobis ovatis obtusis 7 mm. latis utrinque sparse adpresse pubescentibus ciliolatis. *Petala* exteriora 1.7 cm. longa, 5 mm. lata, utrinque sparse adpresse pubescentia, interiora cohaerentia, 1 cm. alta. *Stamina* vix 2 mm. longa, apiculata. *Carpella* 1 mm. alta, glabra, stigmatē fere 2 mm. longo.

Sukotai, Kao Luang, c. 600 m., evergreen forest, *Kerr* 5946.

Mitrephora Winitii, *Craib* [Anonaceae Mitrephoreae]; ab affini *M. Edwardsii*, Pierre, foliis pro longitudine angustioribus, petiolis longioribus et ut videtur floribus maioribus, a *M. grandiflora*, Bedd., cui florum magnitudine similis, foliis basi saepissime cordatulis recedit.

Arbor parva (ex *Winit*); ramuli iuventute fulvo-tomentosi, mox glabri, cortice cinereo reticulato obtecti, lenticellis parvis conspicuis. *Folia* lanceolata, ovato-lanceolata, rarius subelliptico-ovata, apice obtusa, rotundata, vel subacuminata et acutiuscula, basi rotundata vel cordatula, interdum parum inaequilateralia, 5-11 cm. longa, 3.5-4.7 cm. lata, subcoriacea, supra glabra vel ad costam inferne breviter pubescentia, subtus pallidiora, ad costam nervosque laterales densius fulvo-pubescentia, aliter sparsius pubescentia, nervis lateralibus utrinque 9-15 supra tenuibus conspicuis subtus prominentibus intra marginem praesertim superioribus arcuatim coniunctis, nervulis gracilibus supra conspicuis vel subconspicuis subtus rete gracile prominulum efficientibus, margine parum recurva, densius breviter ciliata, petiolo sat crasso 4-5 mm. longo indumento ramulorum supra canaliculato suffulta. *Pedicelli* circa 1 cm. longi, fulvo-tomentosi, apicem versus bracteola vix 1 cm. longa instructi. *Calyx* 1 cm. longus, dorso fulvo-tomentosus, intra sparse pubescens. *Petala* exteriora alba (ex *Winit*), oblongo-obovata, vel elliptico-obovata,

circa 4 cm. longa et 2 cm. lata, extra adpresse fulvo-pubescentia, intra apicem basemque versus sparse pubescentia, interiora purpurea (ex *Winit*), dorso medio fulvo-pubescentia, ungui 1.5 cm. longo dorso fulvo-pubescente suffulta. *Stamina* 2 mm. longa, connectivo truncato papilloso. *Carpella* 1.5 mm. alta, dense adpresse hirsuta.

Prachuab, 80 m., evergreen jungle, *Winit* 577A.

The species described above must be very near *M. Edwardsii*, Pierre, of which species apparently no flowering material can be traced. The flower was evidently described by Pierre from material in comparatively young bud.

Orophea siamensis, *Craib* [Anonaceae-Miliuseae]; ab *O. monospermate*, Craib, foliis maioribus, petalis exterioribus quam sepalis pro rata multo longioribus recedit.

Arbor circa 8 m. alta (ex *Kerr*); ramuli iuvenes sparse adpresse pubescentes, angulati, mox glabri, fusco-corticati, lenticellis subconspicuis notati. *Folia* oblongo-elliptica vel oblongo-oblongata, apice caudato-acuminata, obtusa, basi cuneata, saepe parum inaequilateralia, 10-16.5 cm. longa, 3-5.3 cm. lata, pagina superiore glabra, inferiore pallidiora, praesertim ad costam pilis adpressis sparse instructa, nervis lateralibus utrinque circa 6 supra subconspicuis subtus prominulis, nervulis subtus subprominulis, petiolo 5 mm. longo sat valido supra canaliculato subtus transverse corrugato suffulta. *Flores* axillares, in ramulis vel foliatis vel defoliatis positi, pauci in axillo quoque, pedunculo communi perbrevis, pedunculis partialibus et pedicellis adpresse fulvo-pubescentibus, pedicellis apicem versus unibracteolatis. *Sepala* deltoideo-ovata, sub-obtusa, 1.5 mm. longa, dorso adpresse pubescentia. *Petala* exteriora 4.5 mm. longa, 4 mm. lata, subacuta, extra pilis adpressis sparse instructa, intra glabra, ciliata, interiora 1 cm. longa, medio 2.5 mm. lata. *Stamina* 6. *Carpella* dorso breviter sparse pubescentia, vix 1.5 mm. longa.

Hue Wao, c. 500 m., common in evergreen forest, *Kerr*, 5069.

Stephania brevipes, *Craib* [Menispermaceae-Cocculaeae]; a *S. herbacea*, Gagnep., caulibus haud omnino glabris, foliis minoribus ad nervulos subtus papillosis, inflorescentia brevi puberula recedit.

Caules graciles, volubiles, interdum inferne radicales, iuvenile sicco fusci, mox straminei vel olivaceo-straminei, sulcati, torquati, fere glabri vel apud nodos tantum puberuli vel nonnunquam omnino densius puberuli. *Folia* triangularia vel oblato-triangularia, apice obtusa vel leviter emarginata, breviter mucronata, basi late leviter emarginata vel subtruncata, lateribus rotundata, usque ad 5.7 cm. longa et 6 cm. lata, papyracea, nervis radiantibus 9-10 supra conspicuis subtus prominulis, nervis secundariis (e costa ortis) utrinque 1-3, nervulis rete gracile sub oculo armato conspicuum efficientibus, pagina superiore viridia, glabra, inferiore pallida, magis minusve glauca, ad nervulos papillosa, petiolo 3.5-6 cm. longo interdum parum

puberulo suffulta. *Inflorescentia* ♂ axillaris, circa 5 mm. longa, pedunculis conspicue puberulis, pedicellis circa 0.75 mm. longis. *Sepala* 6, circa 1-1.25 mm. longa et 0.75 mm. lata, inter se subaequalia. *Petala* 3, flabelliformia, 0.6 mm. longa, paulo latiora quam longiora. *Synandrium* 0.5 mm. altum, apice 0.5 mm. diametro.

Doi Sutep, evergreen jungle, 900 m., Kerr 3255.

Stephania erecta, Craib [Menispermaceae-Cocculeae]; ab affini *S. Pierrei*, Diels, caulibus erectis, foliis crassioribus distinguenda.

Caules annui, sub anthesin erecti, saepissime simplices, 7-30 cm. alti, superne glauci, inferne pallidiores, annotini straminei, striati, glabri. *Folia* iuventute sicca glauca, ovata vel rotundata, apice obtusa, mucronulata, 3 cm. longa, 2.5 cm. lata, rigidiuscula, glabra, nervis circa 11 radiantibus, nervulis vix conspicuis, subtus pallidiora, marginata, petiolo ad 4 cm. longo suffulta. *Pseudumbellae* ♂ axillares vel inferiores ex axillis foliorum squamiformium ortae, 5-fere 10 mm. diametro, pedunculo communi 8-20 mm. longo suffultae, glabrae; pedunculi partiales breves; pedicelli 1.5-2 mm. longi, apice articulati. *Flores* expansi 2.5 mm. diametro. *Sepala* saepe varie et irregulariter connata, lanceolata vel ovato-lanceolata, 1.3 mm. longa, 0.8 mm. lata, saepe tridentata. *Petala* haud evoluta. *Synandrium* vix 1.25 mm. diametro, brevissime stipitatum.

Muang Petchabun, c. 50 m., deciduous forest, Kerr 5689.

Lao name, Bua Kûa (ex Kerr).

This is probably the plant mentioned by Diels (in Engler Pflanzenr., Menispermaceae, p. 276) under *S. Pierrei*, Diels, as represented by Siam, *Teysmann*, Mekong, *Harmand*, and *Cochinchina*, *Pierre*.

A tuber received from Dr. Kerr is at present (July 1922) in flower in the Botanic Garden, Aberdeen.

Stephania Kerrii, Craib [Menispermaceae-Cocculeae]; ab affini *S. Delavayi*, Diels, foliis papyraceis, pedunculis masculis longioribus, drupis orbicularibus haud obovoideis recedit.

Caules volubiles, graciles vel subgraciles, saepe tortuosi, glabri, sulcati, substraminei. *Folia* orbiculari-ovata vel fere orbicularia, apice obtusa, interdum obtuse acuminata, mucronata, basi rotundata vel truncata, usque ad 10 cm. longa et 9 cm. lata, papyracea, pagina utraque glabra, superiore viridia, inferiore glauca, nervis 9 radiantibus supra tenuioribus conspicuis subtus subprominulis, nervulis reticulationem subtus plus minusve conspicuam efficientibus, marginata, integra, petiolo circa 7-14 cm. longo basi incrassato glabro suffulta. *Inflorescentiae* ♂ axillares, solitariae vel 2-fasciculatae, inferiore pseudumbellam compositam pedunculo communi 3-3.5 cm. longo suffulta e radiis 3-4 constituta, superiore elongata inferiore 2-3-plo longiore e pseudumbellis racemosim dispositis constituta pedunculo communi 3-5 cm. longo suffulta, pedunculis partialibus ad 2.5 cm. longis, bracteis

parvis vel interdum infimis foliaceis; pedicelli ad 2 mm. longi, paulo infra apicem articulati. *Sepala* 3 exteriora obovato-oblongata vel obovato-oblonga, apice rotundata, 1.5 mm. longa, 3 interiora obovato-oblonga, 1.75 mm. longa, 1.25 mm. lata. *Petala* 3-4, circa 1.25 mm. longa. *Syndrium* 0.75 mm. altum, apice 0.8 mm. diametro, stipite distincto inferne incrassato suffultum. *Inflorescentia* ♀ e pseudumbella axillari vel ramulum brevem axillarem terminante pedunculo communi ad 1.3 cm. longo suffulta ad 1 cm. diametro constituta; pedicelli 1.5 mm. longi. *Ovarium* semiovoideum, glabrum; stigmata 6-partita. *Drupa* orbicularis, 7 mm. diametro; endocarpium faciebus depressum, dorso utrinque costulis circa 16 ornatum.

Chiangmai, 300 m., scrub jungle, *Kerr* 3309. Doi Sutep, 500 m., mixed jungle, *Kerr* 3275.

***Stephania oblata*, Craib** [Menispermaceae-Cocculeae]; a *S. herbacea*, Gagnep., foliis crassioribus, petalis carnosis latioribus quam longioribus, syndrio altiore, a *S. Delavayi*, Diels, inflorescentia minore magis condensata, floribus maioribus, ab ambabus foliorum nervulis rete laxius efficientibus recedit.

Caulis gracilis, glaber, sicco iuventute fuscescens, mox stramineus, sulcatus, torquatus. *Folia* oblata, apice rotundata, costa excurrente breviter apiculata, basi rotundata, subtruncata, vel emarginata, ad 4 cm. longa et 4.5 cm. lata, papyracea, glabra, subtus pallidiora, nervis radiantibus 9 supra conspicuis subtus prominulis, nervulis supra parum impressis subtus subprominulis rete laxum efficientibus, margine pallida, parum reflexa, petiolo ad 5 cm. longo circa 1 cm. supra laminae basem inserto suffulta. *Pseudumbellae* ♂ axillares, solitariae, vix 1 cm. diametro, glabrae, pedunculo communi circa 2.7 cm. longo apice parvi-bracteato suffultae, pedunculis partialibus circa 5 ad 2.5 mm. longis, pedicellis vix 2 mm. longis. *Sepala* 6 vel 8, exteriora 2 mm. longa, 1 mm. lata, interiora exterioribus paululo breviora iisque aequilata. *Petala* carnosa, flabelliformia, 1 mm. longa, 1.5 mm. lata. *Syndrium* 1 mm. altum, apice 1.5 mm. diametro.

Doi Sutep, 720 m., mixed jungle, *Kerr* 2610.

***Cyclea ciliata*, Craib** [Menispermaceae-Cocculeae]; species nova foliis peltatis pagina neutra glabris, inflorescentia ♂ paniculata axillari, sepalis connatis, calyce haud ad medium fisso, syndrio conspicue exserto distincta.

Caules herbacei, e radice perenni orti, volubiles, pilis longiusculis saepissime deflexis sat copiose tecti, striati, demum subsulcati, pallide corticati. *Folia* ovata lateve ovata, apicem versus angustata, longe mucronata, basi truncata vel leviter emarginata, 8-9 cm. longa, 5.3-7 cm. lata, papyracea, supra viridia, subtus pallidiora, subglauca, pagina superiore pilis longis sat rigidis sparse strigosa, inferiore pilis iisdem nisi minus rigidis et numerosioribus instructa, nervis radiantibus 9-11 supra conspicuis subtus prominulis, nervulis pagina utraque conspicuis, margine longe ciliata, petiolo 2.5-3.3 cm. longo 8-13 mm. supra laminae basem affixo indumento caulium suffulta. *Inflorescentia*

♂ elongato-paniculata, axillaris, ad 7.5 cm. longa et 1 cm. diametro, pedunculo communi 1.5–2.5 cm. longo suffulta, pedunculis partialibus ad 4 mm. longis, pedicellis 1–1.75 mm. longis, partibus omnibus pubescentibus vel substrigillosis. *Calyx* extra strigillosus, 1.8 mm. longus, 4-lobatus, lobis deltoideis circa 0.5 mm. longis. *Corolla* 0.6 mm. longa, apice lobulata, glabra. *Synandrium* 2 mm. altum, apice 0.5 mm. diametro.

Doi Sutep, 900 m., on low herbage in evergreen jungle, Kerr 3356.

Cyclea varians, Craib [Menispermaceae-Cocculeae]; a *C. gracillima*, Diels, caule haud glabro, petiolo longiore, a *C. Wattii*, Diels, petiolo haud glabro distinguenda.

Caules e radice perenni volubiles, pilis saepissime deflexis et crispatis hirsuti, primo pallidi, striati, mox fuscescentes, sulcati. *Folia* late ovata, ovata, vel lanceolato-ovata, apice subacuta, mucronata, basi truncata, rarius rotundata, haud rarius cordata, 5–12 cm. longa, 3.5–7.4 cm. lata, chartacea, supra mox ad costam, nervos, nervulosque parce hirsuta, subtus pallidiora, interdum subglauca, molliter pilosa, nervis radiantibus circa 11 supra conspicuis vel subprominulis subtus prominentibus, nervis secundariis (e costa ortis) utrinque 5–6, nervulis reticulationem laxam supra conspicuam subtus prominulam efficientibus, ciliata, marginata, petiolo ad 6 cm. longo 8–10 mm. supra laminae basem affixo crispatim piloso suffulta. *Inflorescentia* ♂ axillaris, anguste paniculata, e pseudumbellis sat densis constituta, interdum ad pseudumbellam unicam redacta, pedunculo communi ad 3 cm. longo cum pedunculis partialibus adpresse setuloso suffulta. *Flores* virides (ex Kerr), expansi 3 mm. diametro, pedicellis circa 1 mm. longis apicem versus articulatis glabris suffulti. *Sepala* 4, oblongo-obovata vel oblongo-elliptica, 1 mm. lata, glabra. *Corolla* carnosula, 0.75 mm. alta, apice lobulata, haud rarius e petalis 4 solutis margine involutis constituta. *Synandrium* corolla paululo altius. *Inflorescentia* ♀ masculae similis sed saepissime ramulis brevibus lateralibus gesta. *Carpellum* gibboso-semiovoideum, glabrum, stigmatibus 3-partito. *Drupa* (vix matura) suborbicularis, 4 mm. diametro.—*Cyclea* sp.n., Craib, Contrib. Fl. Siam, p. 10.

Mê Ta, 480 m., Kerr 2573 (♂). Ban Pong, 330 m., mixed jungle, Kerr 1940 (♀).

Capparis adunca, Craib [Capparidaceae-Cappareae]; species floribus axillaribus solitariis, ovario tomentoso in stylum conspicuum angustato, pedicellis post anthesin incrassatis uncinatis vel saltem curvatis distincta.

Ramuli virides, primo pilis albis brevibus tecti, cito glabri, cortice viridi mox parum brunnescente striato obtecti, lenticellis haud conspicuis. *Folia* ovata vel late lanceolata, rarius ovato-elliptica, apice obtusa, breviter mucronulata, basi rotundata vel cuneato-rotundata, 5–7 cm. longa, 2.7–4 cm. lata, membranacea, pagina utraque cito glabra vel hic et illic pilis brevibus albis

stellatis sparse instructa, nervis lateralibus utrinque 6-8 intra marginem anastomosantibus supra subconspicuis subtus prominulis, petiolo 5-7 mm. longo indumento ramulorum supra canaliculato suffulta. *Flores* saepissime ramulis brevibus lateralibus gestis, axillares, solitarii, pedicello circa 1.3 cm. longo indumento ei ramulorum simili tecto sub anthesin recto cito post anthesin praesertim superne incrassato uncinato suffulti; alabastra pilis parvis stellatis albis plus minusve caducis instructa. *Sepala* oblonga vel obovata, intra glabra, 13 mm. longa, 8 mm. lata, interiora basi angustata, dorso medio carinata, exteriora dorso 3-carinata. *Petala* oblanceolato-obovata, 2.5 cm. longa, 11.5 mm. lata, duo approximata, basi callosa, intra pubescentia. *Stamina* numerosa, glabra, petalis subaequalia vel ea paulo superantia. *Pistillum* staminibus paulo brevius, tomentosum, gynophoro sat robusto; ovarium fusiforme, circa 3 mm. longum, stylo subaequilongum, placentis 3 multiovulatis.

Mûang Pichit, c. 50 m., straggling or climbing shrub in scrub jungle, *Kerr* 5672.

Capparis Kerrii, *Craib* [Capparidaceae-Cappareae]; species nova habitu *C. foetidae*, Blume, similis sed indumento ferrugineo, spinis brevioribus sparsioribus, petiolo paulo longiore ala angusta undulata instructo recedit.

Frutex circa 2-metralis (ex *Kerr*), partibus fere omnibus iuventute indumento brevi ferrugineo e pilis stellatis constituto dense tectis, ramulis gracilibus indumento delapso viridibus striatis. *Folia* obovato-oblanceolata, apice acuminata, acuta, basi cuneata, ad 7 cm. longa et 3.8 cm. lata, membranacea vel chartaceo-membranacea, supra indumento ferrugineo brevi iuventute oblecta, mox sparsius inaequaliter instructa, subtus indumento simili ad costam nervosque laterales dense tecta, aliter sparse instructa, nervis lateralibus utrinque 6-8 intra marginem arcuatim iunctis supra conspicuis vel leviter impressis subtus prominentibus, margine integra, parum recurva, petiolo 7-9 mm. longo indumento ferrugineo stellato oblecto supra canaliculato lamina decurrente anguste undulatum alato suffulta. *Flores* axillares, solitarii vel ad 5 superpositi, pedicellis circa 1 cm. longis suffulti; alabastra sicco viridia, mox plus minusve glabrescentia. *Sepala* oblonga vel elliptico-oblonga, apice rotundata, 5 mm. longa. *Petala* oblonga, 6 mm. longa, 2.5 mm. lata. *Gynophorum* 1.3 cm. longum, glabrum; ovarium glabrum, stylo brevi incluso vix 1.5 mm. longum, placentis 3.

Ban Pong Yêng, 750 m., *Kerr* 3568.

Capparis latifolia, *Craib* [Capparidaceae-Cappareae]; *C. crassifoliae*, Kurz, similis sed foliis maioribus subtus haud glabris, gynophoro haud glabro distinguenda.

Frutex scandens; ramuli tomentosi, grisei vel interdum ferruginei, pilis intermixtis griseis et ferrugineis diu persistentibus, striati vel mox sulcati, aculeis brevibus basi validis tomentosis rectis vel subrectis deflexis. *Folia* elliptica, obovato-elliptica

vel oblata, basi cuneata vel subacuminata, apice emarginata, mucrone indurato reflexo instructa, 5.5–10.5 cm. longa, 6–9 cm. lata, chartacea vel rigide chartacea, pagina superiore glabra vel ad costam nervosque laterales pilis paucis stellatis hic et illic instructa, inferiore pilis brevibus stellatis albis et ferrugineis instructa, nervis lateralibus utrinque 5 supra conspicuis subprominulis subtus prominentibus rectis intra marginem anastomosantibus, nervulis pagina utraque conspicuis, petiolo ad 2 cm. longo pilis iisdem stellatis tecto supra canaliculato suffulta. *Flores* axillares, seriatim dispositi. *Fructus* immaturus 1.8 cm. longus, pedicello ad 3 cm. longo indumento ei ramulorum simili tecto et gynophoro ad 4.5 cm. longo praesertim inferne pilosulo suffultus.

Mûang Lom Sak, c. 200 m., deciduous forest at edge of swampy ground, *Kerr* 5738.

Vern. Kawn Kawng Krûa.

The young fruits have stellate hairs in patches here and there. These hairs appear in many cases to be actually in situ but in others as if derived from the branches or leaves in the process of drying.

Capparis nana, *Craib* [Capparidaceae-Cappareae]; species nova parvifolia, floribus seriatim dispositis, a *C. disticha*, Kurz, eiusque affiniorebus ovario dense tomentoso, gynophoro plus minusve glabrescente distinguenda.

Suffrutex 2–3-pedalis (ex *Kerr*); ramuli divaricati, graciles, fere glabri, pallide virides, striati, aculeis recurvis basi decurrentibus apice nitido-brunneis mox glabris circa 2 mm. longis instructi. *Folia* subrhombico-ovata, apice acuminata, mucronata, basi cuneato-rotundata vel fere rotundata, 3–fere 4 cm. longa, 1.5–2.2 cm. lata, membranacea, pagina utraque sicco viridia, inferiore parum pallidiora, superiore primo sparse pilosa, cito glabrescentia, inferiore sparse pilosula, nervis lateralibus utrinque circa 6 pagina utraque subconspicuis intra marginem anastomosantibus, costa subtus prominente, petiolo gracili circa 3 mm. longo sparse pilosulo supra canaliculato suffulta. *Flores* axillares, solitarii vel ad 3, seriatim dispositi, pedicello gracili ad 1.8 cm. longo primo sparse pilosulo mox plus minusve glabrescente suffulti; alabastra ambitu oblongo-elliptica vel elliptica, viridia, albo-pilosula. *Sepala* oblongo-elliptica, apice rotundata, 4.5 mm. longa, 2.25 mm. lata, intra glabra. *Petala* oblongo-oblancheolata, apice rotundata, 6 mm. longa, 2 mm. lata, duo approximata, basi callosa, intra pubescentia, dorso densius pilosa. *Stamina* 8, glabra, filamentis circa 1.5 cm. longis, antheris 1.75 mm. longis. *Pistillum* staminibus subaequialtum, gynophoro primo plus minusve piloso cito glabrescente; ovarium circa 1 mm. altum, in stylum eo paulo brevior angustatum, cum stylo tomentoso-pilosum, placentis tribus pauci-ovulatis.

Mûang Petchabun, c. 100 m., often forming wide patches in bamboo jungle, *Kerr* 5723.

Capparis siamensis, Kurz, For. Fl. Br. Burma, I. p. 63.

Ratbouri, *Teysmann*, 5927. Pran, jungle, 5 m., *Marcan* 631, 637.

Specimens collected by Marcan in a locality not far from *Teysmann's* collecting ground show that *C. siamensis* is evidently deciduous. The plant is not glabrous, as described by Kurz, the young branchlets being densely covered with a low felt and the leaves being thinly pubescent on both sides, especially on the nerves. The fruit, on a woody gynophore 2.5 cm. long, is about 3.5 cm. long and 2 cm. diameter, apiculate, tomentose, and with 8 longitudinal rows of prominent tubercles, 4 rows being on distinct continuous ridges, the other 4 being without continuous ridges.

Capparis subhorrida, *Craib* [Capparidaceae-Cappareae]; a *C. horrida*, Linn. f., foliis tenuibus deciduis recedit.

Frutex scandens; ramuli saepissime ferruginei, pilis brevibus stellatis ferrugineis et griseis dense tecti, pilis diu persistentibus, laeves, mox striati, aculeis deflexis basi parum decurrentibus circa 3 mm. longis instructi. *Folia* lanceolata, ovato-lanceolata, vel oblongo-lanceolata, apice acuminata, acuta, basi late cuneata vel rotundata, 5.5-10 cm. longa, 3.2-4.2 cm. lata, membranacea, sicco utrinque viridia, supra glabra, nitentia, subtus pallidiora, pilis brevibus albis et hic et illic ferrugineis densius tecta, nervis lateralibus utrinque 5 supra conspicuis subtus prominulis intra marginem anastomosantibus, nervulis supra subconspicuis, petiolo ad 1 cm. longo supra canaliculato indumento ei ramulorum simili tecto suffulta. *Flores* axillares, seriatim dispositi. *Fructus* vix maturus, ambitu elliptico-ovatus, 2.3 cm. longus, pedicello 8-15 mm. longo indumento ramulorum et gynophoro 2.2 cm. longo hic et illic sparse pubescente suffultus, glaber.

Nakawn Tai, c. 200 m., mixed deciduous forest, *Kerr* 5826.

Vern. Sai Sū Yai (ex *Kerr*).

Capparis Winitii, *Craib* [Capparidaceae-Cappareae]; ab affini *C. siamense*, Kurz, spinis deficientibus, floribus minoribus, inter alia distinguenda.

Frutex vel arbor parva, sempervirens, ramulis primo pilis brevibus stellatis plus minusve dense tectis cito glabrescentibus cortice fuscescente striato obtectis demum omnino glabris. *Folia* lanceolata vel ovata, rarius ovato-elliptica, apice obtuse mucronulata, basi cuneata vel rotundata, saepissime cordatula, 6.5-11.5 cm. longa, 3-5.8 cm. lata, chartacea vel chartaceo-coriacea, matura glabra, subtus pallidiora, nervis lateralibus utrinque 4-7 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervulis rete pagina utraque conspicuum vel subconspicuum efficientibus, integra, petiolo circa 1 cm. longo supra canaliculato cito glabro suffulta. *Flores* in axillis foliorum novellorum solitarii, pedicellis sat robustis petiolo subaequilongis ut ramulis pubescentibus suffulti; alabastra ovoidea ellipsoideave, iuventute indumento ei ramulorum simili tecta, mox nisi ad

sepalorum margines plus minusve glabrescentia; corolla pallide viridis vel viridi-lutea, ad bases petalorum superiorum aurantiaca, demum fusco-brunnea vel purpurea (ex *Kerr* et *Winit*). *Sepala* exteriora vix 9 mm. longa, interiora 1.25 cm. longa, dorso pilis brevibus stellatis sparse instructa, plus minusve glabrescentia, intra superne marginem versus dense pilosa. *Petala* ad 2 cm. longa. *Stamina* pistillo subaequalia. *Gynophorum* praecipue superne tomentosum; ovarium dense tomentosum, circa 2 mm. altum, stylo subaequilongum, placentis 3 multiovulatis.

Muang Hawt, 225 m., *Kerr* 2938. Reheng, Mè Kor, 360 m., *Winit* 100.

Lao name, Nam Khi Let or Khi Ka Ton (ex *Winit*).

Scolopia rhinantha, *Clos*, var. *siamensis*, *Craib* [Bixaceae-Flacourtiaceae]; var. nov. foliis basi latis, perianthio 5-mero, placentis duabus distinguenda.

Bangkok, below 5 m., marshy ground; small tree c. 4 m. high, branches with stout simple spines, *Kerr* 4292.

Polygala Kerrii, *Craib* [Polygalaceae-Polygaleae]; a *P. karenium*, *Kurz*, foliis minoribus rigidioribus, bracteis brevioribus inter alia recedit.

Frutex circa 3 m. altus (ex *Kerr*); ramuli iuventute breviter crispatis fulvo-pubescentes, mox glabri, angulati, demum teretes, cortice cinereo-brunneo obteeti, lenticellis subconspicuis. *Folia* lanceolata vel oblanceolata, apice longius acuminata, acuta, basi cuneata, 4–8.5 cm. longa, 1.1–2.2 cm. lata, chartacea, supra ad costam nervosque laterales puberula, aliter hic et illic puberula, subtus pallidiora, pilis longioribus saepissime crispatis eodem modo distributis instructa, nervis lateralibus utrinque 7–9 intra marginem anastomosantibus supra subconspicuis subtus prominentibus, nervulis paucis subtus conspicuis vel pagina utraque subconspicuis tantum, margine integra, ciliolata, petiolo ad 1 cm. longo pilis iis ramulorum similibus instructo suffulta. *Racemi* et oppositifolii et ramulos laterales terminantes, ad 7 cm. longi, pedunculo communi brevi vel ad 8 mm. longo cum rhachi ut ramulis pubescente suffulti; pedicelli circa 4 mm. longi, puberuli; bractee deciduae, 1.75 mm. longae, cuspidato-acuminatae, ciliatae. *Sepalum* superius cucullatum, 6 mm. longum, aliis fere duplo longius, omnibus ciliatis; alae 1.3 cm. longae, densius ciliolatae. *Corolla* 1.5 cm. longa, carinae crista lobulata. *Ovarium* 1.75 mm. altum, compressum, ciliatum, stylo circa 1.4 cm. longo.

Doi Intanon, c. 2100 m., open ridge, flowers bright yellow, *Kerr* 5326.

Xanthophyllum obliquum, *Craib* [Polygalaceae-Xanthophylleae]; ab affini *X. excelso*, *Blume*, foliorum nervis lateralibus obliquis haud patulis, floribus minoribus recedit.

Arbor circa 20 m. alta (ex *Kerr*); ramuli primo minute sparse puberuli, cito glabri, iuventute angulati, lutescentes. *Folia* oblonga vel oblongo-oblanceolata, apice acuminata

vel caudato-acuminata, obtusa, basi cuneata, interdum subacuminata, 5–10 cm. longa, 2–3.5 cm. lata, coriacea, sicco lutescentia, subtus pallidiora, pagina utraque glabra, nervis lateralibus utrinque 6–8 supra conspicuis vix prominulis subtus prominentibus sat obliquis saepissime parum arcuatis rarius subrectis, nervulis subtus prominulis, margine integra, sicco undulata, petiolo circa 6 mm. longo supra canaliculato suffulta. *Paniculae* et axillares et terminales, foliis paulo breviores vel iis parum longiores, rhachi et ramulis complanatis cum pedicellis circa 3.5–5 mm. longis aureo-puberulis. *Sepala* ciliolata, utrinque breviter adpresse pubescentia, exteriora ovato-deltoida, 2 mm. longa, 1.75 mm. lata, crassa. *Corolla* 4.5 mm. longa, carina petalis aliis paulo breviora. *Filamenta* petalis adnata, haud inter alia connata, inferne ampliata. *Discus* crenulatus. *Ovarium* et gynophorum glabra, ovulis circa 8, stylo pubescente 2 mm. longo.

Dan Sai, Kao Keo Kang, c. 1100 m., evergreen forest, *Kerr* 5766.

var. viride, *Craib*, foliis minus coriaceis sicco viridibus a typo recedit.

Dan Sai, Kao Keo Kang, c. 1300 m., evergreen forest, *Kerr* 5766A.

Xanthophyllum siamense, *Craib* [Polygalaceae-Xanthophylleae]; ab *X. affine*, Korth., foliis maioribus tenuioribus, floribus minoribus distinguendum.

Arbor circa 12-metralis (ex *Kerr*), ramulis sparse puberulis substramineis mox brunnescentibus angulatis. *Folia* lanceolata vel oblongo-lanceolata, apice acuminata, obtusa, basi cuneata vel subacuminata, 15–19.5 cm. longa, 3.6–5.8 cm. lata, coriacea, viridia vel lutescente-viridia, subtus pallidiora, supra glabra, subtus ad costam sparse puberula, nervis lateralibus utrinque 6–8 intra marginem anastomosantibus supra subconspicuis vel fere conspicuis subtus prominentibus nervulis subtus prominulis margine integra, sicco undulata, parum recurva, pallida, petiolo 1 cm. longo sparse puberulo mox glabro supra canaliculato suffulta. *Inflorescentia* et axillaris et terminalis, semper ramosa, ad 15 cm. longa, ramulis lateralibus terminales saepe aequantibus, densius aureo-puberula, pedunculis compressis, pedunculo communi ad 2.5 cm. longo, floribus albis (ex *Kerr*) fasciculis saepe suboppositis pseudoverticillatis pedicellis 3–5 mm. longis suffultis. *Sepala* exteriora ovata vel elliptico-ovata, apice obtusa rotundata, 2.75–3.5 mm. longa, 1.8–2.25 mm. lata, utrinque adpresse pubescentia, interiora obovato-elliptica vel elliptica, 3.5 mm. longa, 2.75 mm. lata, extra adpresse pubescentia, intra sparse adpresse pubescentia, omnia ciliolata. *Petala* 6–7 mm. longa, carina aliis paulo breviora dorso pilosa. *Filamenta* petalis adnata, haud connata, inferne ampliata, intra ad latitudinem maximam pubescentia, antheris pilis albis divergentibus instructis.

Ovarium 1 mm. altum, glabrum, ovulis circa 8, stylo pubescente circa 4·5 mm. longo, gynophoro distincto crassiusculo glabro.

Ban Kawng Hě, 960 m., evergreen jungle, *Kerr* 3583.

Indigofera oblonga, *Craib* in *Kew Bull.*, 1914, p. 6, descr. ampl.

Racemi axillares, pedunculo communi petiolo brevioribus indumento ei ramulorum simili tecto suffulti; bracteae filiformes, alabastra conspicue superantes; alabastra adpresse brunneo-hirsuta, paulo ante anthesin apice acuminata; pedicelli paulo ultra 1 mm. longi. *Calyx* antice 3·5 mm. longus, extra griseo-hirsutus. *Vexillum* oblongum, 8 mm. (stipite brevi lato incluso) longum, 5·5 mm. latum; carina et alae vexillo paulo breviores.

Doi Pāhom Pok, Mg. Fāng, c. 1100 m., open evergreen forest, fls. pinkish, *Kerr* 5171.

Mastixia euonymoides, *Prain* in *Journ. As. Soc. Beng.*, LXVII. p. 295, descr. ampl.

Pedicelli 2 mm. longi; receptaculum pedicello paulo longius. *Calyx* 1 mm. longus, truncatus. *Petala* 4, sat crassa, 4·5 mm. longa et 3 mm. lata. *Stamina* 8, filamentis 3 mm. longis, antheris vix 1·5 mm. longis. *Discus* conspicuus, lobatus. *Stylus* crassus, superne gradatim angustatus, 2 mm. supra discum productus, stigmate bilobo.

Doi Sutep, 1670 mm., evergreen jungle, *Kerr* 3237—tree c. 30 m. high.

Described originally from fruiting material (*Kachin, King's Collector*!) this species was treated as incompletely known in Wangerin's monograph (in *Engler Pflanzenr.*). *Kerr's* material shows that *M. euonymoides* belongs to the subgenus *Tetramastixia*. In this group *M. rostrata* Blume alone has strictly opposite leaves and a truncate calyx. *M. rostrata* (Java, *Koorders* 2309 α ! 25634 β !) can be readily distinguished by the markedly caudate-acuminate leaves.

Brandis in *Indian Forester*, 1907, p. 57, t. 7, refers a plant collected in British Bhutan by *Haines* (No. 916!) to *M. euonymoides*. This plant has a lobed calyx, 5-merous flowers (ex *Haines' description*), and moreover has alternate leaves whereas *M. euonymoides* has a truncate calyx, 4-merous flowers, and strictly opposite leaves.

Pueraria linearis, *Hook. f.*, *Fl. Brit. Ind.*, III., p. 197.

Petchaburi, 50 m., *Marcan* 521, 640.

The type material of this species (*Tenasserim, Griffith, K.D.*, 2911!) was not sufficiently complete to determine the relationship of the plant. *Sir Joseph Hooker* placed *P. linearis* provisionally near *P. tomentosa*. *Marcan's* specimens have mature fruit and show that the affinities of the species are with the first group not with the second as arranged in the *Flora of British India*. The fruit is compressed, broadly elliptic about 7 mm. long and 5 mm. broad; the pyrenes are black, with a distinct straw-coloured wing.

Primula siamensis, Craib [Primulaceae]; *P. nutanti*, Delavay ex Franchet, affinis, sed calycis lobis longioribus angustioribus apice haud acuminato-rotundatis differt.

Folia oblanceolata vel oblongo-oblanceolata, apice rotundata vel obtusa, basi in petiolum angustata, ad 7.5 cm. longa et 2.4 cm. lata, membranacea, efarinosa, supra tenuiter pilosa, subtus ad costam, nervos, nervulosque longius et densius pilosa, nervis lateralibus utrinque circa 9 bene intra marginem ramosis cum ramulis in hydathodos sat longos excurrentibus subtus conspicuis margine breviter densius ciliata, petiolo ad 3.5 cm. longo alato suffulta. *Scapus* solitarius, inflorescentiam paucifloram primo capituliformem mox breviter spicatum gerens, pilis brevibus farini-potentibus tectus, apice albo-farinosus; bracteae deciduae, oblongo-lanceolatae vel lanceolatae, calycem vix aequantes, sparse farinosae vel marginem versus tantum albo-farinosae. *Calyx* extra densius albo-farinosus, 6.5 mm. longus, lobis ovatis vel oblongo-ovatis acutiusculis 2.5 mm. longis. *Corollae* violaceae (ex Kerr) tubus (in flore brevistylis) 1.2 cm. longus, limbus 1.3 cm. longus, lobi circa 9.5 mm. longi, apice irregulariter dentati. *Antherae* bene inclusae, circa 2.75 mm. longae.

Doi Chieng Dao, in crevices of limestone rocks, c. 1700–2000 m., Kerr 5582.

Androsace similis, Craib [Primulaceae]; species nova ad sectionem *Pseudoprimulam*, Pax, pertinens, ab *A. axillari*, Franchet, cui maxime affinis, indumento densiore distinguenda.

Herba estolonifera. *Folia* orbiculari-reniformia, ad 1.7 cm. diametro, chartacea vel subrigide chartacea, pagina utraque sparse hirsuto-pilosa, subtus parum pallidiora, nervis vix conspicuis, margine lobulata, lobulis pauci-dentatis vel subintegris, petiolo 1.7–3 cm. longo pilis divergentibus sat copiose tecto suffulta. *Scapi* 6–21 cm. longi, inflorescentias saepius 3 rarius 2 vel 4 superpositas bracteatas et praeterea foliiferas, foliis 2 vel 3 basalibus nisi paulo minoribus et brevius petiolatis similibus, gerentes, anguste sulcati, hirsuto-pilosi, pilis plus minusve deflexis in sulcis densissimis mox cinereis; pedicelli ad 2 cm. longi, superne densius hirsuto-pilosi, pilis deflexis. *Calyx* 3.5 mm. longus, pilis albis divergentibus sat rigidis extra instructus, lobis 1.75 mm. longis obtusis. *Corollae* albae (ex Kerr) tubus calyce paulo longior, lobis obovato-cuneatis emarginatis circa 2.75 mm. longis et latis. *Antherae* 0.75 mm. longae, filamentis brevibus.

Doi Chieng Dao, c. 2100 m., open grassy ground, Kerr 5588.

Lysimachia Smithiana, Craib [Primulaceae]; a *L. cephalantha*, Knuth, cui affinis, foliis minoribus, floribus paucioribus recedit.

Herba basi lignosa, caule pauci-ramoso, ramis erectis vel decumbentibus, pilis crispatis brevibus primo dense mox sparsius induto. *Folia* opposita, late ovata, ovato-lanceolata, vel rarius oblongo-elliptica, apice mucronata, basi cuneata vel subtruncata, 1–2 cm. longa, 0.7–1.6 cm. lata, chartacea, supra pilis sat rigidis

primo parce instructa, mox glabra, subtus pallidiora, iuventute praecipue ad costam breviter hirsuta, demum fere glabra, nervis lateralibus utrinque 3 pagina inferiore subconspicuis, integra, petiolo brevi vel ad 6 mm. longo supra canaliculato suffulta. *Inflorescentia* terminalis, e floribus paucis (saepissime 2-3) constituta. *Calyx* fere ad basem partitus, 6 mm. longus, segmentis lanceolatis acutiusculis 1.5 mm. latis dorso sparse hirsutis. *Corolla* 6.5 mm. longa, fere ad basem partita, segmentis ovatis vel elliptico-ovatis 4 mm. latis dorso rubro-glandulosis. *Filamenta* circa 2 mm. longa, antheris fere 1.5 mm. longis apiculatis. *Ovarium* 1 mm. altum, superne pilis erectis rigidiusculis instructum; stylus 4 mm. longus.

Doi Pāhom Pok, Mg. Fāng, open grassy jungle, c. 1600 m., Kerr 5186.

Symplocos Rajaniana, Craib [Symplocaceae]; speciebus zeylanicis maxime affinis, ramulis iuventute dense villosis, foliis primo supra nisi ad costam glabris subtus dense molliter adpresse pubescentibus distincta.

Arbor circa 8 m. alta (ex Kerr); ramuli hornotini dense villosi, annotini tomentosi, demum glabrescentes, cortice brunneo vel cinereo-brunneo irregulariter striato obtecti, lenticellis haud conspicuis. *Folia* lanceolata, apice acuminata, acuta, basi cuneata vel late cuneata, ad 6 cm. longa et 2.5 cm. lata, supra iuvenilia ad costam longius dense albo-pubescentia, aliter glabra, matura ad costam puberula, subtus primo dense molliter adpresse subfulvo-pubescentia, mox sparse sed praesertim ad costam nervosque pubescentia, costa supra impressa subtus prominente, nervis lateralibus utrinque 8 intra marginem amastomosantibus supra conspicuis subtus prominentibus, nervulis subtus prominulis, margine argute denticulata, mox conspicue recurva, petiolo circa 5 mm. longo indumento ramulorum suffulta. *Spicae* e ramulis annotinis cum foliis novellis ortae pedunculo communi brevi incluso circa 1.5 cm. longae, fulvo-pubescentes. *Receptaculum* 1.5 mm. altum, adpresse pubescens. *Sepala* oblonga vel oblongo-obovata, apice obtusa, incurva, vix 2 mm. longa et 1.5 mm. lata, extra adpresse pubescentia, intra glabra. *Corolla* 9 mm. diametro, segmentis ellipticis vel oblongo-ellipticis ad 2 mm. latis. *Filamenta* ad 5 mm. longa, gracilia, glabra, antheris parvis. *Discus* conspicuus, 5-angularis, hirsutus. (see p. 255.)

Doi Sutep, evergreen jungle, c. 1600 m., Kerr 4684.

Rivea Clarkeana, Craib [Convolvulaceae-Convolvuleae]; ab affini *R. hypocrateriformi*, Choisy, sepalis longioribus fructescentibus angustioribus recedit.

Planta perennis; caules volubiles, fistulosi, iuventute sericei, demum sparse breviter adpresse pubescentes, brunneo-corticati. *Folia* oblata, apice retusa, saepissime apiculata, basi late cordata. ad 16 cm. longa et 21 cm. lata, chartacea vel rigide chartacea, supra glabra, subtus pallidiora, iuventute sericea, demum ad costam nervosque dense adpresse albo-pubescentia, aliter sparse adpresse

pubescentia, nervis supra conspicuis subtus prominentibus, fere e basi 7-nervia, nervis secundariis (e costa ortis) utrinque 3 omnibus intra marginem anastomosantibus, nervis transversis pagina utraque conspicuis, integra, petiolo ad 13 cm. longo apice biglanduloso indumento ei caulium simili tecto suffulta. *Cymae* axillares et terminales, 3-5-florae, pedunculo communi ad 7 cm. longo suffultae, pedunculis partialibus circa 5-7 mm. longis, pedicellis terminalibus fere 1 cm. longis, omnibus sericeis; bracteae et bracteolae deciduae. *Calyx* 1.4 cm. longus, partibus exterioribus sericeus. *Corolla* in alabastro adpresse albo-pubescentis, expansa 8 cm. longa, apice 6.5 cm. diametro tubo circa 4.5 cm. longo. *Fructus* operculatus, brunneus, nitidus, magis minusve globosus, paulo ultra 1 cm. diametro, sepalis duriusculis patulis vel reflexis persistentibus.—*R. ornata*, Choisy, var. *Griffithii*, C. B. Clarke, pro parte?

Chiengmai, 300 m., cultivated from seeds collected in deciduous jungle near Lampang, *Kerr* 3383.

Glossocarya siamensis, *Craib* [Verbenaceae-Caryopterideae]; a *G. molli*, Benth., partibus omnibus minus pubescentibus recedit.

Ramuli iuventute breviter subdense crispatis pubescentes, demum glabri, pallide brunneo-corticati, conspicue striati. *Folia* ovata vel oblonga, apice breviter acuminata, basi cordata lateve cordata, ad 9 cm. longa et 5.5 cm. lata, chartacea, pagina utraque sed inferiore sparsius ad costam nervosque puberula, subtus pallidiora, nervis lateralibus utrinque 4-5 intra marginem arcuatim iunctis supra conspicuis subtus prominulis, integra, petiolo 6-10 mm. longo supra canaliculato suffulta. *Corymbi* 3-7 cm. diametro, et terminales et in axillis superioribus positi et ibi vel pedunculo nudo suffulti vel ramulos breves terminantes, foliis subaequilongi vel iis paulo longiores; pedunculi partiales ad 2.5 cm. longi, folia parva basem versus interdum gerentes: pedicelli breves; pedunculi et pedicelli densius breviter pubescentes. *Calyx* obpyramidalis-cupularis, 3 mm. longus, apice denticulatus, extra puberulus, distincte nervosus. *Corolla* non visa. *Fructus* circa 8 mm. longus et 2.5 mm. diametro, et puberulus et pilis longioribus sparsius instructus.

Bankok, under 5 m., on bushes along canal, *Kerr* 4502.

Hymenopyramis cana, *Craib* [Verbenaceae-Caryopterideae]; ab *H. brachiata*, Wall., foliis subtus canis recedit.

Frutex; ramuli primo adpresse plus minusve crispatis pubescentes, quadrangulares, 4-sulcati, mox puberuli, cinereo-brunneo-corticati, lenticellis longitudinaliter elongatis plus minusve lineatim dispositis. *Folia* elliptico-ovata, ovata, rarius lanceolata vel obovata, apice acuminata, acuta, basi cuneata vel rotundato-cuneata, ad 9 cm. longa et 5.2 cm. lata, rigide chartacea vel subcoriacea, supra sicco fusciscentia, ad costam puberula, subtus cana, nervis lateralibus utrinque 5-6 cum costa supra impressis subtus prominentibus, nervis transversis supra leviter impressis subtus prominulis, integra, petiolo 6-10 mm.

longo pubescente suffulta. *Inflorescentia* generis. *Flores* adhuc ignoti. *Calyx* frutescens inflatus, ei *H. brachiatae*, Wall., similis, circa 1 cm. longus; fructus 4 mm. longus, hirsutus et glandulosus.

Mê Ping Rapids, Kêng Soi, on rocks, c. 400 m., *Kerr* 4637.

XXXVI.—FRUIT CULTURE IN FLORIDA.

Fruit-growing is a subject of importance in tropical countries, not only from the point of supplying markets for local consumption, but also in the hope of establishing an export trade to markets in temperate and more densely populated countries. The accompanying résumé of a paper by DR. J. C. TH. UPHOF, in which he gives his experiences of fruit-growing in tropical and sub-tropical Florida, should be of interest to those similarly engaged in other tropical countries.

Fruit-growing in Florida has become an important industry during recent years, and has been developed through the introduction of modern systems of orchard management, the use of machinery, the latest methods in combating insect pests and plant diseases, and in organising a sound system of marketing. These results have been largely possible through the enterprise of American and European financiers, the work of the United States Agricultural Experiment Stations and the Department of Agriculture, and the lessons learnt from the study of similar industries in the neighbouring State of California.

Oranges, grape fruit, tangerines and pecans are already on the markets as crops of first importance, whilst the cultivation of avocados, mangos, and other tropical fruits is being prosecuted with energy. It is hoped that the pineapple industry, which during the last eight years has steadily declined, will also be revived.

Citrus Fruits.

Nurseries.—Oranges are budded on to sour orange or grape fruit stock when it is three to four years old. Satsuma oranges are generally budded on to *Citrus trifoliata*, as this stock can stand the cold better in the northern part of Florida.

Seeds of the stock are sown in nurseries in December and January, that of *Citrus trifoliata* in September and October. Sowings are made in rows 2 ft. apart, and the seedlings transplanted when one year old to rows 4 ft. apart, where for one or two years they remain to get established. They are then budded, wax cloth being used to fasten the bud, and, provided the bark easily separates from the stem, the operation may be carried out at any time of the year. In the spring seedlings are topped, but the shoot from the introduced bud is staked if necessary and only pinched back when it is some 30 in. long.

Planting.—The land is first cleared, broken, and prepared, and the young trees planted out in December and February

during their resting period. They must not be planted too deep as their roots are surface-feeders, and care must be taken not to expose the roots before planting. The best plan is to have the holes opened only just ahead of the planters who bring the seedlings in boxes from the nurseries. It is advisable to mix about 1 lb. of chemical fertiliser with the soil of each plant before filling in the hole; fresh manure is not recommended. A thorough watering must be given after planting and repeated every ten days for some time, each plant receiving 5 to 10 gallons. The usual planting distances are, for oranges and grape fruit, 25×25 ft., or in the best soils 30×30 ft., for Satsuma oranges, 20×20 ft., for lemons 20×25 ft., for limes 15×20 ft., for kumquat oranges 10×15 ft.

A most important fact to be borne in mind is that Citrus fruits must have good drainage. In Florida, where the land is usually very sandy, a hard pan is occasionally found a few feet below the surface, and this is generally be broken by dynamite, so as to lower the water level of the soil.

Manures.—The supply of organic matter must receive careful attention by way of green manures and in regular applications of chemical fertilisers.

As green manures, leguminous plants are generally grown, and of these preference is given to Velvet Beans (*Stizolobium Deeringianum*, Bort., and *S. niveum*, Roxb.) and the Iron and Brabham varieties of the Cow Pea (*Vigna sinensis*, L.). In the matter of chemical fertilisers the number of applications and composition of the fertiliser require to be varied according to the age of the crop. Young trees receive three or four applications a year, in the spring, once or twice in the summer, and finally in September. The spring and summer fertilisers contain 5 per cent. nitrates, 6–8 per cent. phosphates and 2–3 per cent. potash, but in the autumn the nitrates are reduced to 2–3 per cent. The first application is 1 to 2 lbs. a tree, and is increased by 1 lb. a tree until the trees are five to six years old and are in full bearing. Fertiliser is then given three times a year with a percentage of 3 to 4 of nitrates, 7 to 8 of phosphates and 3 to 4 of potash, until the trees are some ten years old when the amount per tree is 15 to 30 lbs. yearly, whilst large, old trees may require as much as 30 to 70 lbs.

Catch crops and honey.—Catch crops of cabbage, lettuce, beans and strawberries, and even peaches are grown for the first three or four years, but should then be cut out.

Bee-keeping provides a useful side crop, besides being important to the trees for pollination purposes. Excellent honey is obtained from the Citrus flowers, and the light-coloured Italian bee, which is common in the United States, is the one usually kept. When the flowers are over, however, the bees may be removed.

Pruning.—This is confined to thinning out unnecessary branches and shaping the tree and is generally done in summer.

The Crop.—The trees flower in March and April and occasionally again in the early summer. The fruit is gathered from November to the following April.

The following are the varieties of fruit in cultivation in Florida :—

Oranges.—*Parsons Brown.*—One of the earliest to fruit (Oct. and Nov.). The fruit is of good dessert quality and is sweet even whilst the skin is still green. Grows best when grafted on sour orange stock.

Pineapple.—A leading mid-season orange (Dec. to March). Excellent dessert qualities, with a pineapple flavour. Travels well. Grows vigorously and is a prolific bearer.

Valencia Late.—A late fruiting variety (March to May). At present this fruit is fetching high prices.

Lue Gim Gong.—Another late variety. Extensively grown in some parts of Florida.

Washington Navel.—So far not grown to any extent. Kid Glove oranges, so-called because the skin readily peels, are also widely cultivated. They fetch good prices.

Tangerines.—*Dancy.*—Widely grown. Fruits December to March. A prolific bearer.

Satsumas.—*Owari* and *Ikeda* varieties are generally grown. They should be budded on stock of *Citrus trifoliata*.

Temple.—Recently introduced and at present on trial.

Grape Fruits.—*Hall.*—Ripens February and March. Good dessert. Prolific bearer.

Marsh Seedless.—Ripens February and March. Good dessert, without the bitterness characteristic of grape fruit, and almost seedless.

Walter.—Ripens February and March. Good dessert but is very "seedy." A vigorous grower and prolific bearer.

Dunecan.—Ripens April, May and June. Excellent dessert. A vigorous grower and good bearer and more hardy than the preceding.

Kumquat.—*Nagami* is the most popular variety and has oval fruits. Used for preserving.

Marumi.—Fruits roundish. Used for preserving.

Meiwa.—Can be eaten as a dessert fruit in a fresh state.

Lemons.—Grown only in southern Florida as they cannot stand the cold.

Seedless Villafranca.—Commonly planted. Vigorous grower and good bearer.

Lisbon.—Recommended as its fruit ripens during the winter months.

Limes.—More generally cultivated than lemons. The groves are composed of seedling trees.

Tahiti is recommended as a budded variety.

Avocados.—The Avocado is coming into favour as a salad, especially in the northern markets. It is generally grown in the south of the State, as only the varieties belonging to the Mexican group can stand the cooler climate in the north.

They can easily be grown from seeds sown at stake, but budded varieties obtained from nurserymen in southern Florida are preferred.

For budding purposes locally obtained seed is sown about an inch deep in rich loam in boxes, 5 ins. square and 14 ins. deep, and must be kept moist. When the seedlings are about 10 to 12 ins. high and the bark readily separates, they are budded, the buds being taken from selected trees and from twigs about the size of a pencil.

Budded seedlings are planted out 21 × 21 ft. for the weaker varieties, to 30 × 25 ft. for the more vigorous ones and the inferior trees should be removed at a later stage to allow the others to develop. Holes should be dug about 3 ft. across and 2 ft. deep and well-rotted manure applied. Drainage is important, and hard pans must be broken if necessary. During the dry seasons frequent cultivation of the plantation is necessary to preserve the moisture of the soil.

Early and *Baldwin* are early varieties which mature their fruit in July. *Trapp*, *Fuerte*, *Lula*, *Nimlish* and *Queen* ripen from October and November till the early spring.

Mangos.—Although this fruit is a comparatively recent introduction and its cultivation is confined to the warm, southern part of the State, it has secured a ready market. The majority of the trees are seedlings, but many grafted and budded varieties are being grown. It prefers well drained, undulating land and is very responsive to fertilisers, which are applied in the same manner as they are to Citrus trees. Planting out is generally done in midsummer at a distance of 21 × 21 ft. to 26 × 26 ft., according to the fertility of the soil, the plants being protected from the sun by cheese cloths or some similar material. Thorough surface cultivation is essential, and a cover crop of Velvet beans is generally grown during the rainy season. The following varieties are recommended: *Mulgoba*, fruits late, of excellent quality, though an irregular bearer; *Amini*, fruits early and is a prolific bearer. The fruit is not picked until it is almost ripe, but this necessitates careful packing and quick transport.

Peaches.—Before planting out, land intended for peach-growing is generally put under a crop of Velvet beans. The young peach trees are put in during their resting period in December and January, when they are 3 to 4 ft. high, and are pruned back at planting. They should receive a good watering.

Pruning is confined to thinning out and shaping the trees, which are grown as dwarf trees and not as espaliers. The fruit is picked when it is starting to colour, but whilst the flesh is still firm. Varieties in cultivation are: *Peen-to*, *South China*, *Bidwell's Early*, *Angel*, *Hall*, *Jewel*, *Bidwell's Late*, *Waldo*, and *Millen's Favourite*. The best variety for the warmer parts of the country is *Jewel*.

Persimmons.—The Japanese Persimmons or Kaki were introduced some forty years ago, but new varieties are occasionally met with. The fruit finds a regular market.

They are generally propagated by cleft or whip grafting, as budding has not proved successful. The stock used is seedlings of Japanese Persimmon or the American *Diospyros virginiana*, the latter being preferred as it is a more vigorous grower.

Stock plants are first planted in seed beds and when 10 to 12 in. high are planted out in rows 2 ft. by 6 in. apart, where they are grafted. When the grafts are established they are put out in the plantation during December and January at distances 15 × 20 ft. Varieties with an upright growth such as *Castata*, are planted closer, those with a more spreading habit like *Hachiya* are planted further apart. They do not need so much fertiliser as is given to other fruit trees, 5 lbs. containing 3 per cent. nitrates, 6 per cent. phosphates, and 10 per cent. potash is sufficient for six-year old trees. Pruning and cultivation is carried out as with the crops already mentioned.

Fruits are cut or clipped from the trees when they are quite ripe though before they soften. The following varieties are in cultivation: *Hachiya*, a vigorous grower, bearing fine, large fruits with a deep yellow flesh; *Okama*, a vigorous grower and prolific bearer, the fruits are large and of fine quality with a light, clear flesh and a light-brown centre; *Hyakume*, a good grower and fruits freely, fruits large with dark-brown flesh, sweet and crisp; *Triumph*, ripens from September to December, medium size fruit, flesh yellow and but few seeds; *Tsuru*, a late variety, vigorous grower and good bearer, fruits large, flesh orange yellow, but astringent until quite mature; *Garley* is planted between the rows as it produces great quantities of pollen and materially assists the fruit production of the orchard generally.

Pecans.—This fruit is generally grown in the northern part of the State, and is similar to a Walnut, but smoother and more elliptic. Its fleshy kernels are in demand for candies and cakes, and when ground are used to flavour ice creams.

They are propagated by budding and grafting, but these operations require experience, as they are not always successful. Planting out takes place in January and February, the distance depending on the variety and varies from 40 to 75 ft., root pruning taking place previously. The trees take 10 to 12 years before they carry full crops. Varieties in cultivation are the following, and are chiefly selected for the large thin "shell" of the fruit:

Curtis, a medium-sized fruit with a thin shell, easily cracked, and with a rich flavour; *Money-maker*, a good bearer, fruit medium size and shell rather thicker; *Frotscher*, a good grower and bears well, fruit large; *Schley*, a medium size fruit of good quality and fine flavour; *Russell*, a thin-shelled, medium size fruit, a regular and good cropper; *Success*, a good bearer with large sweet nuts, rather late in season.

Meteorological Data.—The range of temperatures and rainfall which has to be considered in Florida, and on which the foregoing observations on fruit culture have been made are indicated in the following table in which are given the records for Jacksonville in the north-east, approximately 30° N. 81° W., Tampa on the Gulf of Mexico, at approximately 28° N. 83° W., and Miami in the south, at approximately 26° N. 80° W.

Observations of the U.S. Weather Bureau for 1920.

Jacksonville.					Tampa.				Miami.			
Month.	Max. Temp F.	Min. Temp F.	Av. Temp F.	Rain- fall. Inches	Max. Temp F.	Min. Temp F.	Av. Temp F.	Rain- fall. Inches	Max. Temp F.	Min. Temp F.	Av. Temp F.	Rain- fall. Inches
Jan. -	79	25	57	1.21	82	35	64	2.70	81	35	69	0.41
Feb. -	74	32	54	9.16	76	38	59	3.10	82	41	64	1.60
Mar. -	88	31	60	0.82	85	36	64	0.60	83	34	68	0.06
April -	88	45	69	3.42	87	46	72	8.04	87	48	75	3.15
May -	87	61	72	7.41	89	62	76	1.49	87	64	76	10.33
June -	95	66	79	8.27	92	67	80	4.49	86	65	79	3.90
July -	92	67	80	5.47	93	68	81	12.20	88	70	81	6.61
Aug. -	94	68	81	7.46	93	69	81	5.66	88	69	80	4.12
Sept. -	95	53	79	7.19	92	62	80	6.49	89	70	80	6.94
Oct. -	82	45	69	0.11	87	50	72	0.12	83	59	75	5.04
Nov. -	80	38	62	5.38	84	42	66	3.07	82	54	72	3.73
Dec. -	76	35	56	3.35	80	39	60	1.47	81	43	68	1.72
Year -	—	—	—	59.20	—	—	—	49.42	—	—	—	47.61

The following extremes have been recorded:—

	Minimum temp.	Maximum temp.
Jacksonville	10° F. (Feb. 1899).	104° F. (July 1879).
Tampa	18.9° F. (Dec. 1894).	97.5° F. (June 1918).
Miami	27° F. (Feb. 1917).	96° F. (July 1907 and Aug. 1919).

FUNGUS AND INSECT PESTS.

The following are the principal diseases encountered :—

ROOT DISEASE.—"Foot Rot," caused by *Phytophthora terrestris*. Chiefly attacks old sweet-seedling groves, and is rarely found where the sour orange stock has been raised, as this appears very resistant to attacks. It first appears in the collar or in the main roots, just below the surface of the soil. The decaying bark has the appearance of being water-soaked and a watery gum is found beneath it. Diseased parts are cut out and the wounds painted with an antiseptic. The use of seedlings of the sour orange stock is the best way to prevent the appearance of this disease.

STEM DISEASES.—"Withertip," caused by *Colletotrichum gloeosporioides*. Attacks the twigs and branches, especially of lime and lemon varieties. It appears as a withering and dying back of the twigs and branches. Pruning is recommended, and some growers spray with Bordeaux Mixture (4-4-50) directly after winter pruning.

"Gummosis," cause at present unknown. Appears generally on sweet oranges and grapefruit varieties. Appears as an exudation of gum and the formation of characteristic spots on the trunk and large branches. The treatment recommended is the removal of the dead and diseased bark down to the healthy wood; treat with an antiseptic and cover with tar or whitelead paint.

"Dieback." At present the cause of this disease is not known.

"Scaly Bark" is caused by *Cladosporium herbarum*, var. *citricolum*. Spraying with Bordeaux Mixture (5-5-20) is recommended.

LEAF DISEASE.—"Melanose" is caused by *Phomopsis citri*.

FRUIT DISEASES.—"Fruit Rot," caused by *Colletotrichum gloeosporioides*. Causes an anthracnoselike spotting of the fruit. An ammoniacal solution of copper carbonate is recommended and must be applied every ten days until the disease is under control.

"Fruit Canker," caused by *Pseudomonas citri*, was generally reported, but has been got under control by a well-organised State campaign and quarantine. It appears on the fruit and young twigs as characteristic light brown spots $1/16$ th- $1/4$ in. in diameter, occurring singly or in groups and coalescing. On the leaves it appears as watery spots. All attacked trees must be destroyed.

"Citrus Scab" is caused by *Cladosporium citri*.

Of insect pests the following are the commonest :—Citrus White Fly (*Dialeurodes citri*), Purple Scale (*Lepidosophes Beckii*), Rust Mite (*Eriophyes oleivorus*), Florida Red Scale (*Chrysomphalus aonidum*), and Cloudy-winged White Fly

(*Dialeurodes citrifolia*). Spraying is recommended with a mixture of soap $\frac{1}{2}$ lb., paraffin oil 2 gallons, water 1 gallon, diluted to 10 to 50 times with water.

Biological control by the introduction of entomogenous fungi has received considerable attention and is assisted by the Florida State Plant Board, who distribute fungi cultures for this purpose.

XXXVII.—NOTE ON JUNGERMANNIA HUMILIS.

W. H. PEARSON.

Being interested in *Jungermannia humilis*, Hook. f. & Tayl., on account of having received specimens from New Zealand, which I thought might be referred to it, I wrote to Kew asking permission to see the original specimen from Kerguelen's Land collected by Dr. Hooker on the Antarctic Expedition. The Director kindly sent me the specimen, which had been referred to the genus *Lophocolea* by Stephani, after having been examined by him, as he states in his "Species Hepaticarum," vol. II, p. 50 (1906).

I was also favoured by having the opportunity of examining two specimens from the same region, collected by Cunningham, which had been named by Stephani, *Lophocolea humilis*, Hook. f. & Tayl. (his own handwriting being on the packets). Also in a Set of Exotic Hepaticae purchased from Weigel there was a specimen named by Stephani, *Lophocolea humilis*, Hook. f. & Tayl., which had been collected by Dusén in Patagonia.

On careful examination I find the four specimens named *Lophocolea humilis* by Stephani are four widely different species belonging, so far as my knowledge of Hepaticae goes, to three different genera; they all agree, however, in having large underleaves. Unfortunately the specimens being sterile, it is somewhat difficult to determine whether a plant is a *Lophocolea* or a *Leioscyphus*, but one character, the postical branches, is constant in the type of *Leioscyphus humilis*, and this with the large free underleaves, along with a firmer texture, sufficiently enable me to refer it to that genus, and not to *Lophocolea* which has lateral branches with the underleaf often connate to the adjoining leaf.

The specimens collected by Dusén are also to be referred to *Leioscyphus*. It is, however, an entirely different species from *humilis*; the shapes of the leaves, some of which are apiculate, and the different shape of the underleaves at once separate it.

One of Cunningham's specimens is a true *Lophocolea* and the other a *Conoscyphus*.

I add a full description and figures of the four species.

The terms used in my descriptions denoting size of plants and cells are those adopted by Dr. Spruce, in his "On Cephalozia, its subgenera and some allied genera." Malton (1882), and other works.

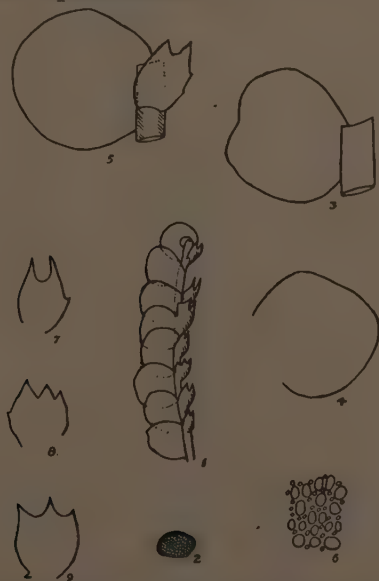
Leioscyphus humilis [Hook. f. & Tayl.] Pearson. Dioicous. Small, pale brown in colour, caespitose. Stems simple or slightly branched, branches postical or rarely postico-lateral, ascending stem frontally compressed, 30 cortical cells, dark coloured but similar in size to inner, which are 12×8 cells in diameter; rhizoids ascending to apex of stem, delicate, hyaline. Leaves horizontally inserted, imbricate, concave, second, antical (lower) margin slightly decurrent, postical (upper) often extending a little beyond the stem; orbicular or broadly ovate, entire or slightly retuse; cells minute, roundish, walls thin, trigones distinct. Underleaves free from the leaves, large (patulous), concave, oval or broadly oval, bifid to $\frac{1}{3}$, sometimes trifid, segments acute, sinus rounded or acute, sometimes unidentate on one side. No ♂ or ♀ seen.

Dimensions: Stem 1 cm. long; with leaves 0.75 mm. wide; 0.1 mm. to 0.2 mm. diameter; leaves 0.75 mm. \times 0.75 mm., 0.65 mm. \times 0.75 mm.; cells 0.015 mm.; underleaves 0.5 mm. \times 0.4 mm.; segments 0.15 mm., 0.5 mm. \times 0.3 mm., segments 0.15 mm.

Kerguelen's Land: 1846, J. D. Hooker, in Herb. Kew.

Observations. The postical branches, free underleaves, and texture clearly refer this species to *Leioscyphus* instead of to *Lophocolea* to which genus Stephani has referred it.

Of course it has no connection with the *Solenostoma humilis* of Mitten, if such a species exists.



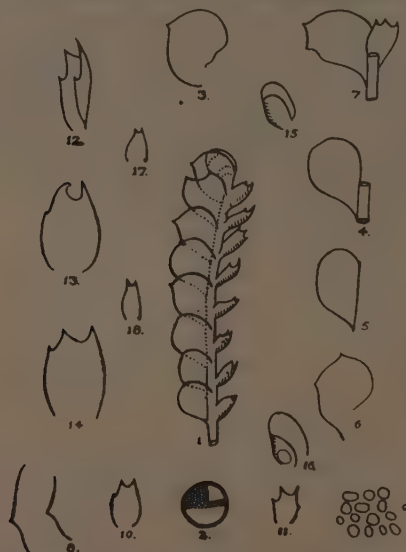
Description of Text figures. Fig. 1. Portion of stem, postical view ($\times 12$). 2. Cross-section of stem ($\times 25$). 3, 4. Leaves ($\times 25$). 5. Leaf & underleaf ($\times 25$). 6. Portion of leaf ($\times 130$). 7-9. Underleaves ($\times 25$).

Leioscyphus patagonicus, *Pearson*, sp. nov. Dioicous. Small dark olive brown in colour, caespitose, flagelliferous. Stem slightly ramose, branches postical, innovant terminal branches postico-lateral; radiculose, rhizoids few, delicate, hyaline, ascending to apex of stem, arising from stem below the underleaves, cross-section of stem round, cortical cells smaller than the inner, 50 to 60, inner 15 cells in diameter. Leaves obliquely inserted, patent (50°) to erecto-patent (30°), secund, subopposite, imbricate obovate-spathulate, entire, apiculate or bi-apiculate; antical (lower) margin decurrent or sometimes longly decurrent; postical (upper) margin covering stem or extending a little beyond; cuticle polished; cells small, roundish, walls thickened, trigones absent. Underleaves free from leaves, large, patulous, concave, oval, bidentate to $1/5$ th, with a small tooth on one or both sides, segments acuminate, sinus broad, rounded.

Androecia on short lateral catkins, 4 pairs of perigonial bracts, bracteoles oval, bidentate, segments acute.

Dimensions. Stems 1 to 2 cm. long; with leaves 0.7 mm. wide; diameter 0.1 mm. to 0.25 mm.; leaves 1.1 mm. \times 0.7 mm., 0.1 mm. \times 0.7 mm., 0.9 mm. \times 0.7 mm.; cells 0.02 mm.; underleaves 0.55 mm. \times 0.4 mm., segments 0.1 mm., 0.55 mm. \times 0.3 mm., segments 0.125 mm., 0.5 mm. \times 0.3 mm., segments 0.15 mm. perigonial bracts 0.6 mm. \times 0.4 mm.; perigonial bracteoles 0.5 mm. \times 0.3 mm.

Patagonia, Molyneux Sound: 1st June, 1896, *P. Dusén*.



Description of Text figures. Fig. 1. Portion of stem, postical view ($\times 12$). 2. Cross-section of stem ($\times 25$). 3-6. Leaves ($\times 12$). 7. Leaf & underleaf ($\times 12$). 8. Margin of leaves ($\times 25$). 9. Portion of leaf ($\times 130$). 10, 11. Underleaves ($\times 12$). 12, 13, 14. Ditto ($\times 25$). 15, 16. Perigonial bracts ($\times 12$). 17, 18. Perigonial bracteoles ($\times 12$).

Observations. The specimen was named by Stephani *Lophocolea humilis*, Hook. & Tayl. from which it differs in shape of leaves, presence of teeth on them and other characters.

***Lophocolea subretusa*, Pearson, sp. nov.** Dioicous. Medium size; pale brown in colour; loosely caespitose; stem sparingly ramose, branches horizontal or slightly ascending, lateral, cross-section of stem broader than high, antical plane, postical convex, 40 to 45 cortical cells, similar in size or slightly smaller than inner which are large and hyaline, with distinct trigones, 12×12 cells in diameter. Leaves horizontally inserted, alternate, imbricate, rotund-quadrate or broadly oval-quadrate, longer than broad, entire or retuse, antical (lower) margin very slightly decurrent, postical (upper) margin covering stem, cells between smallish and medium size, quadrate, 4-5 and 6-sided, walls thick, trigones indistinct or wanting. Underleaves narrowly connate with leaf on one side, trifid or quadrifid to below the middle, often with one or two smaller teeth, segments lanceolate-acuminate. No ♂ or ♀ seen.

Dimensions. Stem 2 cm. long; with leaves 3 mm. wide; diameter 0.3 mm.; leaves 1.25 mm. \times 1. mm., 1.1 mm. \times 1. mm., 1. mm. \times 0.8 mm., 0.9 mm. \times 0.8 mm.; cells 0.03 mm.; underleaves 0.4 mm. \times 0.3 mm.; segments 0.2 mm., 0.35 mm. \times 0.35 mm., segments 0.2 mm.



Description of Text figures. Fig. 1. Portion of stem, postical view ($\times 8$). 2. Cross-section of stem ($\times 12$). 3-5. Leaves ($\times 12$). 6. Leaf ($\times 25$). 7. Portion of leaf ($\times 130$). 9, 10. Underleaves ($\times 25$).

Tyssen Islands : Falkland Sands ; January, 1868, *Cunningham* 106 in Herb. Kew.

Observations. These specimens have been named by Stephani *Lophocolea humilis*, Hook. f. & Tayl. It is a true *Lophocolea* but widely different from *L. humilis*.

The nearest species from the Antarctic according to the description is *Lophocolea microstipula*, St., also collected by Cunningham (Fretum magellanicum), which has obovate entire leaves with a narrow base. Nothing is said of any retuse leaves and the underleaves are described as free.

Conoscyphus flaccidus, *Pearson*, sp. nov. Dioicous. Small ; pale brown in colour, apices dark brown ; loosely caespitose. Stem on cross-section slightly angular and frontally compressed ; simple or slightly ramose, soft, flaccid, delicate texture ; branches postical, erect, almost equal in size to stem, rhizoids delicate, hyaline, arising from the base of the underleaves in bunches. Leaves secund, imbricate or amplexicaul, erecto-patent (30°), reniform or orbicular, margin entire except that at the antical (lower) base there are usually 1 to 4 teeth, antical margin decurrent, crispate ; postical (upper) margin rotundate, slightly ampliate, extending to beyond the stem, rarely furnished with 2 very minute teeth ; texture soft, flaccid ; cuticle papillose ; cells small, irregular in size, roundish, walls thick, trigones large. Underleaves free from the leaves, large, concave, broadly oval, bifid to $1/3$ rd, unidentate on both sides, segments acute, sinus wide, rounded. No antheridia or archegonia were seen.

Dimensions. Stems 2 cm. long ; with leaves 1 mm. wide ; diameter 0.1 mm. to 0.2 mm. ; leaves 0.9 mm. high \times 1.25 mm. broad ; cells 0.02 mm. ; underleaves 0.5 mm. \times 0.4 mm., segments 0.15 mm., 0.45 mm. \times 0.4 mm., segments 0.15 mm.

Straits of Magellan : Punta Arenas ; March, 1868, *Cunningham* 194, in Herb. Kew.

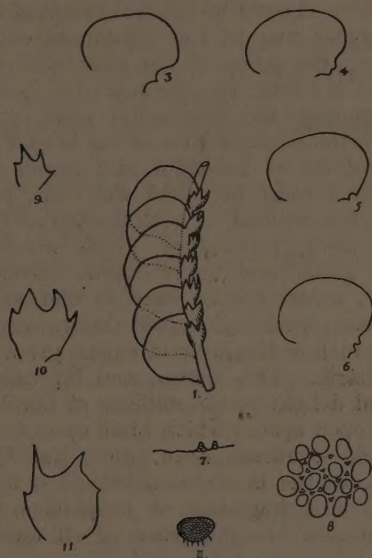
Observations. The soft, flaccid texture of the plant with the reniform or orbiculate leaves and their dentate, crispate base distinguish this species from any other ; some cells are free from colouring matter and are larger, giving the leaves an ocellate appearance.

Its nearest ally is *Conoscyphus trapezioides*, Sande-Lacoste, from Java, from which it differs in the shape of its leaves and underleaves. *Conoscyphus trapezioides* (Sande-Lacoste) St. (= *Chiloscyphus trapezioides*, Sande-Lacoste,) has been made a synonym of *Conoscyphus inflexifolium*, Mitten, by Stephani, to which species he also refers *Diploscyphus borneensis*, De Notaris ; if the descriptions and figures of Sande-Lacoste and De Notaris are of any value this reference is difficult to understand.

Specimens of *Conoscyphus borneensis* collected by Prof. Setchell in Tutuila agree exactly with De Notaris's description and figures. The specimens named by Stephani *Lophocolea*

humilis from Punta Arenas collected by Cunningham are quite different and as stated, nearly allied to *C. trapezioides*.

When moistened for examination, the soft flaccid stems of this plant are remarkable.



Description of Text figures. Fig. 1. Portion of stem ($\times 12$). 2. Cross section of stem ($\times 25$). 3-6. Leaves ($\times 12$). 7. Margin of leaf at base ($\times 25$). 8. Portion of leaf ($\times 130$). 9. Underleaf ($\times 12$). 10, 11. Underleaves ($\times 25$).

XXXVIII.—MISCELLANEOUS NOTES.

W. H. Hudson.—The recent death of that keen lover of nature and charming writer, William Henry Hudson, cannot pass unnoticed in the Bulletin.

If only as a contributor to the Bulletin, Mr. Hudson's name deserves to be remembered with gratitude. He it was who contributed the list of the wild birds in the Gardens in the "Wild Fauna and Flora," published in 1906, and his list is prefaced by some characteristic and most interesting notes on the habits of the birds found wild in Kew.

His claim to remembrance however rests on a more important and possibly little known service to the Gardens.

The Queen's Cottage grounds owe their present wild natural condition of untouched rural beauty very largely to Hudson's efforts. As at the time he wrote and championed the cause of the Queen's Cottage grounds being left as a Bird Sanctuary, so now, demands are made that the public shall be given access to the grounds and be allowed to wander where they will.

People fail to appreciate how much they gain from the grounds being kept sacred as a wild preserve and the beauty of which they can see fully and quite unspoilt by trodden-down paths, disfigured bluebells and an absence of bird life.

All that is now enjoyed by the real lovers of nature who come to Kew is largely due to the passionate energy with which Hudson took up the cause of the preservation of the Cottage Grounds and it is fitting to conclude this brief tribute to his memory by quoting the concluding paragraph of his introductory note on the Birds of Kew in the Wild Fauna and Flora.

"To the volume of beautiful bird sound produced by all these true singers must be allied the calls, songs, and other notes, some highly musical, of such species as the daw and jay, nuthatch, ring-dove, turtle-dove, green wood-pecker, cuckoo, wryneck, little grebe, and many others. Even in a perfectly rural district it would not be easy to find so great a variety in the same space; and it is indeed this variety and abundance of bird music which to the lover of nature gives to Kew Gardens its principal charm. This charm, and its value as a place of refreshment and delight to the millions of London, it will retain so long as the open spaces which abut upon it—Old Deer Park and Syon Park—continue open, and the Queen's Cottage ground is kept, as the late Queen wished it to be kept, in its present state, as a fragment of unspoilt wildness, and the favourite haunt and breeding-place of all the most attractive species of birds which inhabit Kew."

South Australian Botany.—The British Science Guild (South Australian Branch) has apparently arranged to issue a series of Handbooks of the Flora and Fauna of South Australia. The first part of the "Flora of South Australia" in this series, by J. M. Black, has recently been received. In addition to an author's preface, this part contains a brief history of botany in South Australia, a glossary of botanical terms, a key to the families, and a systematic account of the Pteridophyta, Gymnosperms and Monocotyledons. The arrangement followed is that of Engler & Prantl. Family, generic and specific descriptions of all the indigenous plants and established aliens are given, together with keys to the genera and species. The descriptions of the Orchidaceae (by Dr. R. S. Rogers) are fuller than most others in the book and it is unfortunate that the standard reached in them has not been attained in the majority of the generic and specific descriptions of the remaining families dealt with in this part.

The black and white text illustrations will doubtlessly be of considerable value to those who use the work as an introduction to South Australian botany. They might have been increased in number with advantage.—W. B. T.

* Flora of South Australia, Part I., by J. M. Black. Cyatheaceae-Orchidaceae. Adelaide, 1922. 3s.

West Indian Agricultural College.—The first year's prospectus of the West Indian Agricultural College, which is to be opened at St. Augustine's, Trinidad, in October has just been issued.

The provisional arrangements include the following courses and facilities for study :—

(1) The Diploma Course, which will extend over three years and give a thorough training in the science and practice of Tropical Agriculture.

(2) A one-year Course in Elementary Agricultural Science.

This course is intended for those who cannot take the full course and should be of value in affording students with some practical training on the scientific side of tropical planting and up-to-date methods of production and management.

(3) Courses for Agricultural Officers.

These are intended for officers who have been selected for service in Tropical Agricultural Departments and should be of very great benefit if arrangement can be made whereby they can take such courses before proceeding to their substantive appointments.

Provision is also being made for Post Graduate Research by University Graduates of other Institutions. This should be one of the most valuable sides of the College's activities.

Many problems in Tropical Agriculture, especially in Plant Pathology, Physiological Botany, Genetics, &c., await solution, and research undertaken by competent Research Students should lead to results of far-reaching importance, which cannot fail to be of value to agriculturists in all parts of the Tropical Dominions of the Empire.

The opportunity thus afforded to University Graduates to carry out their research work in the tropics and to see something of a tropical fauna and flora is one which British scientific workers have long desired.

Copies of the Prospectus can be obtained from the Secretary of the College, 14, Trinity Square, London, E.C. 3, and further particulars can also be obtained from him or from the Principal, St. Augustine's, Trinidad.

Contributions to the Flora of Siam.—*Michelia Rajaniana* and *Symplocos Rajaniana* described on pages 225 and 239 were named by Prof. Craib in honour of H.H. Prince Bidyalankarana (whose family name is Rajani), Vice-Minister of Commerce, under whose auspices the Botanical Section of the Ministry was inaugurated.

Beech Wood and the Brush Industry.—Although in some parts of the country beech wood is sold at little above the price of firewood, it is an important timber in the home counties where

it realises a satisfactory price and enters into the manufacture of a wide range of articles. Even the smallest pieces of sound wood are put to some good use, whilst decaying wood and sawdust are utilised for the generation of steam. Amongst the many uses of beech wood that of the brush industry is very prominent and an idea of its importance may be gleaned from the large number of manufacturers represented each year at the British Industries Fair. Beech is not the only wood used by brush manufacturers but it is the principal wood utilised, for the blocks of such kinds of ware as scrubbing, boot, clothes, and nail brushes. For such work the blocks into which the bristles are secured must be made of wood that will withstand the boring of a large number of holes and the subsequent secure wiring of the bristles into position without the fracture of the slender divisions between the holes. At the same time the wood must be reasonable in price and easily obtainable. Beech combines the necessary properties in a high degree, in fact no other wood has yet been found that answers the purpose so well. An idea of the strain put upon the blocks may be gathered from the fact that 187 holes are required in a boot brush block $8\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $\frac{1}{4}$ in., and 140 holes in a scrubbing brush block $1\frac{1}{2}$ in. by $2\frac{3}{4}$ in. by $\frac{3}{8}$ in. These holes have then to be filled with bristles and the bristles tightly wired. Beech is, however, only used to finish off the commonest brushes. For the better grades of scrubbing brushes a very thin veneer of beech, dyed black, is placed over the wires and the brush is finished off with a back of horse chestnut. The back must be of a white wood that finishes with a very smooth surface and does not splinter. Lime, sycamore and horse chestnut are all used but the latter is by far the best wood for the purpose. For boot brushes the back may be sycamore, cherry, sweet chestnut, birch or various other kinds, and for clothes brushes all these woods are used with others such as mahogany, ebony, and other exotic woods that finish well and take a good polish.—W. D.